Space Weather Forecast

Issued on Tuesday, 15 March 2022 at 00:42 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of G1/Minor geomagnetic storm early on Day 1 (15 Mar), otherwise declining. Chance of M-class flares. Chance of Active fluence by Days 2-4 (16-18 Mar).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with a Moderate class flare at 14/0840 UTC from a large and fairly complex region near north centre disc. There are also four other sunspot regions on the visible disc. There is a large but stable region which will be rotating off the Earth-side of the disc towards the end of Day 1 (15 Mar). The other regions are all small and simple. There is one slow weak Coronal Mass Ejection (CME) observed on 13 March which may give a glancing blow at Earth on the 17 Mar, but with low confidence.

Solar Wind / Geomagnetic Activity: Solar winds showed the effects of a CME which arrived at 13/1014 UTC. Solar wind speeds have been slightly elevated throughout the period. The Interplanetary Magnetic Field started strong and declined to moderate levels. The important north-south component started similarly strong, before a steady decline to moderate levels. Geomagnetic activity reached G2/Moderate Storm interval (Kp 6) between 14/0000-0300, but has been Quiet to Unsettled since then, as the CME influence begins to wane.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be mainly Low, perhaps Moderate, with a chance of Moderate-class flares. The risk of M-flares mainly comes from the large region near north centre disc, especially since it has recently developed some additional magnetic complexity.

Solar Wind / Geomagnetic Activity: Ongoing CME effects are expected to gradually decline through Day 1 (15 Mar). There is a risk of further periods of southward oriented Bz, and is currently weakly positive. There is also a slight chance of a glancing blow from a weak CME on Day 3 (17 Mar). No coronal hole effects are currently expected during this period.

Geomagnetic activity is expected to be Quiet to Active, with a chance of further G1/Minor Storm intervals if we do see any further periods of negative Bz, mainly early on Day 1 (15 Mar). The risk of G1 intervals declines through Day 1, with mainly Quiet activity returning, although there is a very slight chance of an increase in activity if we do see the weak CME on Day 3 (17 Mar).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is forecast to be at background levels with no solar radiation storms, although there is just a very slight chance of an increase in response to any larger flares that may occur.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	20	1	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	25	25	25	25
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	2	2	2	2
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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